

as necessary to provide sufficient strength to anchor contacts sufficiently tightly, especially when press-fit, to withstand the forces imposed on the contacts during movement into mating engagement. Forming the step aligned vertically below the contact-retaining portion on the bottom of the thick, vertical wall of the contact-retaining portion is an easier manufacturing step and results in minimal weakening of the overall housing structure which are important advantages for economic mass production at high volume and for providing connectors of minimal size as required to satisfy the inexorable trend to miniaturization with increasing board complexity. It also affords balanced forces produced during mating and requires that the front, mating end of the connector project only a relatively short distance from the edge of the circuit board, minimizing the unsupported length and the requirement for off-board space.

In contrast, the reference teaches a different approach from the claimed invention in providing a step at the rear of the wall, not forming the step on the bottom of the wall aligned vertically below the contact retaining portion. This would result in the disadvantage of the mating end of the prior connector, (the entire portion to the left of the step), protruding further beyond the edge of the circuit board, in an unsupported state, increasing both inherent fragility and off-board space occupied by the connector.

Accordingly, it is clear that the claimed connector provides a different approach from that taught by the reference which different approach provides significant practical advantages both of manufacture and application in a very crowded technical field and where space and cost are at a premium.

It is therefore submitted that the claimed subject matter cannot be considered to be obvious over the reference and defines patentable subject matter.

. Favorable reconsideration of the Application is requested.

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IN THE UNITED STATES PATENT OFFICE

Utility Patent Appln No: 09/897663

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Inventors: AZUMA

Title: RIGHT-ANGLE TYPE ELECTRICAL CONNECTOR

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Assistant Commissioner of Patents  
Washington, DC 20231

ALTERATIONS TO CLAIMS IN ACCOMPANYING AMENDMENT

1.(Amended) A right angle type electrical connector comprising:  
a housing which extends laterally and includes a fitting part at a front thereof and  
a mount bottom surface [at a lower end thereof], said fitting part being engageable with  
a mating connector and said mount bottom surface to be placed on a surface of a  
circuit board for fixing said housing on said circuit board ; and

a plurality of electrical contacts which are aligned laterally and retained in said  
housing, an end of each contact forming a connecting portion being positioned at said  
fitting part and to be brought in to contact with a corresponding contact of said matable  
connector and another end being positioned behind said fitting part and to be  
connected and fixed to a circuit provided on said circuit board;

said fitting part of said right -angle type electrical connector being engageable  
[through said fitting part] with said matable connector by mating movement in a front  
[and] to rear direction that is parallel to said circuit board;

wherein:

said housing includes a foot portion which extends rearward beyond connecting  
portions of said electrical contacts,


said connecting portions to be connected to said circuit board, and  
said mount bottom surface extends to a rear end of said foot portion

and wherein said fitting part of said housing has a lower surface and said mount  
bottom surface of said housing is located at a higher level than said lower surface of

said fitting part of said housing, and a step is provided between said lower surface of said fitting part and said mount bottom surface, the housing having a contact-retaining portion with a thick, vertically extending wall in which contact-retaining portion said contacts are retained tightly, said step being formed on a bottom of the wall vertically aligned below the contact-retaining portion.

Cancel claims 2 and 3

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